

WHAT IS CLAIMED IS:

- 1 1. A method for controlling exhaust gas recirculation of an
2 internal combustion engine comprising:
3 determining a condition during engine operation in EGR mode at
4 which an intake manifold temperature is below an intake manifold critical
5 temperature at which condensation occurs in said intake manifold;
6 switching to a boost mode in response to said determining;
7 predicting a value of at least one of intake manifold temperature and
8 intake manifold pressure if the engine were operated in EGR mode;
9 calculating an intake manifold critical temperature as a function of
10 said predicting a value; and
11 switching to exhaust gas recirculation mode when said predicted
12 intake manifold temperature in EGR mode exceeds said calculated intake manifold
13 critical temperature.
- 1 2. The invention as described in claim 1 wherein said predicting
2 comprises measuring a value of said at least one of intake manifold pressure and
3 intake manifold temperature during engine operation in Boost mode.
- 1 3. The invention as described in claim 2 wherein said predicting
2 comprises adjusting said measured value of said at least one of intake manifold
3 temperature and intake manifold pressure with a differential determined by a
4 difference in measurement at Boost mode and at EGR mode.
- 1 4. The invention as described in claim 3 wherein said adjusting
2 comprises selecting an adjustment value from a table of empirically determined
3 values of said at least one of said intake manifold temperature and intake manifold
4 pressure.
- 1 5. The invention as described in claim 4 wherein said table is
2 generated as a function of engine load and engine speed.

1 6. The invention as described in claim 5 wherein said empirically
2 determined values comprises a temperature or pressure reading in EGR mode less
3 a temperature or pressure reading, respectively, in boost mode.

1 7. A computer readable storage medium having data stored
2 therein representing instructions executable by a computer to control a compression
3 ignition internal combustion engine installed in a vehicle to perform an exhaust gas
4 recirculation re-entry from a boost mode operation, the computer readable storage
5 medium comprising:
6 instructions for predicting a value of at least one of intake manifold
7 temperature and intake manifold pressure in EGR mode from a measurement taken
8 in Boost mode;
9 instructions for calculating an intake manifold critical temperature in
10 EGR mode as a function of said predicted value; and
11 instructions for switching to exhaust gas recirculation mode when said
12 predicted intake manifold temperature in EGR mode exceeds said calculated intake
13 manifold critical temperature in EGR mode.

1 8. The invention as described in claim 7 wherein said instructions
2 for predicting comprises predicting each of said intake manifold temperature in EGR
3 mode and intake manifold pressure in EGR mode.

1 9. The invention as described in claim 7 wherein said instructions
2 for predicting include instructions for adjusting a measured value in Boost mode
3 with a differential established as a function of engine speed and engine load.

1 10. The invention as described in claim 8 wherein said instructions
2 for calculating include an equation determining intake manifold critical temperature
3 in Boost mode as a function of both said predicted intake manifold temperature in
4 EGR mode and said predicted intake manifold pressure in EGR mode.

1 11. The invention as described in claim 10 wherein said equation
2 is a linear equation.

1 12. A system for controlling a compression ignition internal
2 combustion engine in a vehicle with expedited re-entry to an exhaust gas
3 recirculation operating mode from a boost mode operation comprising:
4 a monitor for determining boost mode operation;
5 a processor for predicting a value of at least one of intake manifold
6 temperature and intake manifold pressure as a function of measuring said at least
7 one in Boost mode;
8 calculating an intake manifold critical temperature as a function of
9 said predicting a value; and
10 a controller for switching to exhaust gas recirculation mode when said
11 predicted temperature exceeds said calculated intake manifold critical temperature.

1 13. The invention as described in claim 12 wherein said system
2 comprises a sensor for measuring said at least one of intake manifold temperature
3 and intake manifold pressure in said Boost mode to provide a measured value.

1 14. The invention as described in claim 12 wherein said processor
2 comprises a compensator for adjusting said measured value to an adjusted value
3 representing EGR mode operation.

1 15. The invention as described in claim 14 wherein said
2 compensator comprises at least one look-up table.